

WE CLAIM AS OUR ³⁷~~INVENTION~~
~~Claims~~

1. A nonaqueous electrolyte battery comprising:
a case constituted by a laminate film and accommodating a unit cell such that said unit cell is sealed by heat welding; and
electrode terminal leads electrically connected to electrodes which constitute said unit cell and sandwiched by a heat weld portion so as to be exposed to the outside of said case, wherein
said electrode terminal leads are coated with sealant resin at a position corresponding to said heat weld portion, and
at least a portion of said sealant resin which is in contact with either principal plane of each of said electrode terminal leads is deformed along the shape of each of said electrode terminal leads so that at least said portion of said sealant resin is formed into an uneven shape.
2. A nonaqueous electrolyte battery according to claim 1, wherein said sealant resin is constituted by single heat welding resin.
3. A nonaqueous electrolyte battery according to claim 2, wherein said heat welding resin is at least one type of material selected from polyolefin, ethylene-acrylate copolymer, ethylene-methacrylate copolymer, ionomer resin and carboxylic resin.
4. A nonaqueous electrolyte battery according to claim 3, wherein said polyolefin is acid denatured polyolefin.

5. A nonaqueous electrolyte battery according to claim 1, wherein said sealant resin is multilayer sealant resin constituted by combining heat welding resin and resin having a melting point which is higher than the melting point of said heat welding resin.


6. A nonaqueous electrolyte battery according to claim 5, wherein the melting point of said heat welding resin and the melting point of said resin having the melting point higher than the melting point of said heat welding resin are different from each other by 20°C or larger.

7. A nonaqueous electrolyte battery according to claim 5, wherein said heat welding resin is at least one type of material selected from polyolefin, ethylene-acrylate copolymer, ethylene-methacrylate copolymer, ionomer resin and carboxylic resin, and

said resin having the melting point which is higher than the melting point of said heat welding resin is at least one type of material selected from polyimide, polyamide and polyester.

8. A nonaqueous electrolyte battery according to claim 7, wherein said polyolefin is acid denatured polyolefin.

9. A nonaqueous electrolyte battery according to claim 5, wherein said sealant resin incorporates a base material made of resin having a melting point which is higher than the melting point of said heat welding resin, and a heat welding resin layer is formed on each of the two sides of said base material.

10. A nonaqueous electrolyte battery according to claim 9, wherein said heat welding resin layer is formed by coating.
11. A nonaqueous electrolyte battery according to claim 1, wherein the length of protrusion of said sealant resin over said case is larger than the thickness of said case.
12. A nonaqueous electrolyte battery according to claim 1, wherein the thickness of said sealant resin is 10 μm to 500 μm 
13. A nonaqueous electrolyte battery according to claim 1, wherein an electrolyte constituting said unit cell is a gel electrolyte or a solid electrolyte containing a matrix polymer and lithium salt.
14. A nonaqueous electrolyte battery according to claim 1, wherein a negative electrode constituting said unit cell contains a material which permits doping/dedoping of lithium.
15. A nonaqueous electrolyte battery according to 14, wherein said material which permits doping/dedoping of lithium is a carbon material.
16. A nonaqueous electrolyte battery according to claim 1, wherein a positive electrode constituting said unit cell is a positive electrode containing a composite oxide of lithium and transition metal.
17. A method of manufacturing a nonaqueous electrolyte battery such that a unit cell is accommodated in a case constituted by a laminate film, electrode terminal leads electrically connected to electrodes constituting said unit cell are exposed to the outside of said case, the outer surface of said case is welded with heat and said unit

cell is sealed in said case, said method of manufacturing a nonaqueous electrolyte battery comprising the steps of:

placing sealant resin in portions in which said electrode terminal leads correspond to a heat weld portion; and

causing a heater head having an elastic member provided for at least either surface thereof which is in contact with said sealant resin to sandwich said electrode terminal leads to weld said electrode terminal leads with heat.

18. A method of manufacturing a nonaqueous electrolyte battery according to claim 17, wherein said elastic member is made of a material having a melting point of 100°C or higher.

19. A method of manufacturing a nonaqueous electrolyte battery according to claim 17, wherein said elastic member is made of at least one material selected from silicon rubber, polytetrafluoroethylene, polyurethane, polyimide, polyamide and polyester.

20. A method of manufacturing a nonaqueous electrolyte battery according to claim 17, wherein the thickness of said elastic member is not smaller than 10 μm nor larger than 2 cm.

21. A heat welding apparatus comprising:

a pair of heater heads for sandwiching electrode terminal leads on which sealant resin is placed at positions corresponding to a heat weld portion of a case, wherein

at least either of said heater heads has an elastic member provided for the surface which is in contact with said sealant resin.

22. A heat welding apparatus according to claim 21, wherein said elastic member is made of a material having a melting point of 100°C or higher.
23. A heat welding apparatus according to claim 21, wherein said elastic member is made of at least one type of material selected from silicon rubber, polytetrafluoroethylene, polyurethane, polyimide, polyamide and polyester.
24. A heat welding apparatus according to claim 21, wherein the thickness of said elastic member is not smaller than 10 μm nor larger than 2 cm.

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